



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/810,088 | 03/26/2004 | Craig E. Deibele | 1231 | 8196 |

24298 7590 04/14/2005

UT-Battelle, LLC
Office of Intellectual Property
One Bethal Valley Road
4500N, MS-6258
Oak Ridge, TN 37831

| |
|----------|
| EXAMINER |
|----------|

KRAMSKAYA, MARINA

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

2858

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/810,088

Applicant(s)

DEIBELE, CRAIG E.

Examiner

Marina Kramskaya

Art Unit

2858

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5 is/are rejected.
- 7) ☒ Claim(s) 4 and 6 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/26/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, & 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hayafuji, US 4,703,256, in view of Bogaty, US 5,103,161, and Takay et al., US 6,749,928.

As per Claim 1, Hayafuji discloses a circuit card strip line Fast Faraday cup system (FIG. 1-2, **10**) for measuring the structure of a charged particle beam **25**, the system including

- a first dielectric **11**;
- a conductor **14** bonded to the first dielectric, a portion of the conductor **14a** used as a beam target **12**;
- a second dielectric **15** bonded to the conductor by means of a bonding dielectric;
- a second ground plane **17** bonded to the second dielectric, the second dielectric and the second ground plane having a channel **17a** for the unimpeded passage of the beam **25** to the beam target **12**; and

Art Unit: 2858

- a high bandwidth digitizer (processing circuit **100**) connected to the conductor **14**.

Hayafuji does not disclose a first ground plane, a bonding dielectric having the same dielectric constant as the first dielectric, and an electrodynamically matched high bandwidth digitizer to the conductor and the beam target. Hayafuji does not disclose connecting the first ground plane to the second ground plane by electroplated stitching.

Bogaty discloses

- a first ground plane **12**;
- a bonding dielectric having the same dielectric constant as the first dielectric (ei. teflon dielectric for both dielectrics; column 3, lines 54-59);
- an electrodynamically matched high bandwidth digitizer to the conductor and the beam target (column 3, lines 38-40).

Takaya discloses connecting the first ground plane **21** to the second ground plane **21** by electroplated stitching (plating through-hole **15** with conductor **16**).

Therefore, it would have been obvious to a person of ordinary skill in the art to include

a first ground plane, as taught by Bogaty, in order to increase the protection of the strip line;

a bonding dielectric having the same dielectric constant as the first dielectric, as taught by Bogaty, in order to have a uniform dielectric; and

Art Unit: 2858

an electrodynamically matched high bandwidth digitizer to the conductor and the beam target, as taught by Bogaty, in order to avoid erroneous output to the digitizer.

Further, it would have been obvious to a person of ordinary skill in the art to use electroplating to connect the ground planes, as taught by Takaya, in the strip line Faraday Cup of Hayafuji, in order to increase connectivity between the layers.

As per Claim 3, Hayafuji as modified discloses the Faraday cup system as applied to claim 1 above.

Hayafuji does not disclose connecting the conductor to the high bandwidth digitizer by means of a single edge launch connector.

Bogaty discloses connecting the conductor to the high bandwidth digitizer by means of a single edge launch connector (column 3, lines 38-40).

Therefore, it would have been obvious to a person of ordinary skill in the art to connect the conductor to the high bandwidth digitizer by means of a single edge launch connector, as taught by Bogaty, in the Faraday cup system of Hayafuji, in order to have a secure connection to the digitizer.

As per Claim 5, Hayafuji as modified discloses the Faraday cup system as applied to claim 1 above.

Hayafuji does not explicitly disclose the high bandwidth digitizer as a sampling oscilloscope.

Art Unit: 2858

Bogaty discloses the high bandwidth digitizer as a sampling oscilloscope
19.

Therefore, it would have been obvious to a person of ordinary skill in the art to include a sampling oscilloscope, as taught by Bogaty, in the Faraday cup system of Hayafuji, in order to measure the output.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hayafuji, Bogaty, and Takay as applied to claim 1 above, and further in view of Cho et al., US 6,300,642.

Hayafuji as modified discloses the Faraday cup system as applied to claim 1 above.

Hayafuji does not disclose a bias conducting ring located at the channel in the second ground plane, and a means for applying a voltage to the bias conducting ring.

Cho discloses a bias conducting ring **26B** located at the channel **26A** in the second ground plane, and a means for applying a voltage **50** (column 3, lines 50-52) to the bias conducting ring **26B**.

Therefore, it would have been obvious to a person of ordinary skill in the art to include a bias conducting ring, as taught by Cho, in the Faraday cup system of Hayafuji, in order to suppress collection of secondary electrons in the cup (channel) (column 3, lines 42-43),

Allowable Subject Matter

4. Claims 4 and 6 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As per Claim 4, the prior art fails to teach connecting the conductor to the high bandwidth digitizer by means of two edge launch connectors.

As per Claim 6, the prior art fails to teach a vector network analyzer, in a Faraday cup system, for processing a time-delayed, amplified charged- particle-beam-induced signal from the Fast Faraday cup including the steps of

measuring the frequency response of the cabling, vacuum interconnects, and amplifier between the Fast Faraday cup and the high bandwidth digitizer;

Fourier transforming the digitized signal from the high bandwidth digitizer; multiplying the frequency response, Fourier transformed digitized signal, and a window function; and

inverse Fourier transforming the multiplied frequency response, Fourier transformed digitized signal and window function result to obtain the calibrated time domain charge distribution in the Faraday cup.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ekdahl Jr. et al., US 4,633,172, Teruya et al., US

Art Unit: 2858

5,583,427, Ishi, US 6,815,960, and Yamada et al., US 6,768,324, disclose a strip line Fast Faraday cup system for analyzing particle beams.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marina Kramskaya whose telephone number is (571)272-2146. The examiner can normally be reached on M-F 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571)272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



ANJAN DEB
PRIMARY EXAMINER

MK

Marina Kramskaya
Examiner
Art Unit 2858

